

567—69.9(455B) Intermittent sand filters.**69.9(1) General requirements.**

a. *Use.* Intermittent sand filters may be used when the administrative authority determines the site is unacceptable for a full-sized soil absorption system.

b. *Location.* Intermittent sand filters shall be located in accordance with the distances specified in Table I.

c. *Sampling.* A sampling port shall be available at the discharge point of the filter or shall be installed in the discharge line. Monitoring and effluent sampling of intermittent sand filters must meet the requirements of the NPDES permit as specified in rule 69.2(455B). Such sampling shall be performed annually for a subsurface sand filter as described in 69.9(3) and twice a year, at six-month intervals, for free access sand filters as described in 69.9(4). (Beginning January 1, 2005, such sampling shall be done by a qualified sampler.) Tests shall be run on all samples for carbonaceous biochemical oxygen demand (CBOD5) and *Escherichia coli* (*E. coli*) (testing for *E. coli* is limited to locations noted in the following sentence), and once a year in the spring for total suspended solids (TSS). The maximum CBOD5, TSS, and *E. coli* count limits are as follows. *E. coli* tests shall only be required where effluent is discharged into (directly or within one mile upgradient of the shoreline of) a Class "A1," Class "A2," Class "A3" or Class "C" water.

Effluents Discharging To	<i>E. coli</i> cfu/100 mL	CBOD5 mg/L	TSS mg/L
Class "A1," "A2," "A3" and "C" waters*	235	25	25
All other water use classifications	no limit	25	25

*A separation distance of 750 feet shall be maintained between any point of discharge and the shoreline of a Class "A1," "A2," or "A3" water.

d. *Prohibited construction.* There shall be no construction, such as buildings or concrete driveways, covering any part of an intermittent sand filter.

69.9(2) Construction.

a. *Number.* An intermittent sand filter shall consist of one filtering bed or two or more filtering beds connected in series and separated by a minimum of 6 feet of undisturbed earth.

b. *Pipelines.* Each bed shall contain a horizontal set of collector lines. The collector lines shall be equivalent to SDR 35 PVC pipe, 8-inch diameter gravelless drainpipe or other suitable materials.

(1) One collector line shall be provided for each 6 feet of width or fraction thereof. A minimum of two collector lines shall be provided.

(2) The collector lines shall be laid to a grade of 1 inch in 10 feet (or 0.5 to 1.0 percent).

(3) Each collector line shall be vented or connected to a common vent. Vents shall extend at least 12 inches above the ground surface with the outlet screened, or provided with a perforated cap.

(4) Gravelless drainfield pipe with fiber wrap may be used for the collector lines. If so, no gravel or pea gravel is required covering the collector lines. The pipe shall be bedded in filter sand.

(5) If 4-inch plastic pipe with perforations is used for the collector lines, they shall be covered as follows:

1. Gravel $\frac{3}{4}$ inch to $2\frac{1}{2}$ inches in size shall be placed around and over the lower collector lines until there is a minimum of 4 inches of gravel over the pipes.

2. The gravel shall be overlaid with a minimum of 3 inches of washed pea gravel 1/8-inch to 3/8-inch size interfacing with the filter media. A layer of fabric filter may be used in place of the pea gravel. Fabric filters must be 30 by 50 mesh with a percolation rate of at least 5 gal/sq.ft.

(6) A minimum of 24 inches of coarse washed sand shall be placed over the pea gravel or above the gravelless drainfield pipe. The sand shall meet the Iowa DOT standards for concrete sand: 100 percent shall pass a 9.5 mm screen, 90 to 100 percent shall pass a 4.75 mm screen, 70 to 100 percent shall pass a 2.36 mm screen, 10 to 60 percent shall pass a 600Tm screen, and 0 to 1.5 percent shall pass a 75Tm screen.

69.9(3) Subsurface sand filters.*a. Distribution system and cover.*

(1) Gravel base. Six inches of gravel $\frac{3}{4}$ inch to $2\frac{1}{2}$ inches in size shall be placed upon the sand in the bed.

(2) Distribution lines. Distribution lines shall be level and shall be horizontally spaced a maximum of 3 feet apart, center to center. Distribution lines shall be rigid perforated PVC pipe.

(3) Venting. Venting shall be placed on the downstream end of the distribution lines with each distribution line being vented or connected to a common vent. Vents shall extend at least 12 inches above the ground surface with the outlet screened, or provided with a perforated cap.

(4) Gravel cover. Enough gravel shall be carefully placed to cover the distributors.

(5) Separation layer. A layer of material such as unbacked, rolled $3\frac{1}{2}$ -inch-thick fiberglass insulation, untreated building paper of 40- to 60-pound weight, synthetic drainage fabric or 4 to 6 inches of marsh hay or straw shall be placed upon the top of the upper layer of gravel.

(6) Soil cover. A minimum of 12 inches of soil backfill shall be provided over the beds.

(7) Distribution boxes. A distribution box shall be provided for each filter bed where gravity distribution is used. The distribution boxes shall be placed upon undisturbed earth outside the filter bed. Separate watertight lines shall be provided leading from the distribution boxes to each of the distributor lines in the beds.

b. Sizing of subsurface sand filters.

(1) Gravity flow.

1. For residential systems, single bed subsurface sand filters shall be sized at a rate of 240 square feet of surface area per bedroom.

2. Dual subsurface sand filters, constructed in series, shall be sized at the rate of 160 square feet of surface per bedroom in the first filter and 80 square feet of surface area per bedroom in the second filter in the series.

(2) Pressure dosed.

1. For residential systems, single bed subsurface sand filters dosed by a pump or dosing siphon may be sized at a rate of 180 square feet of surface area per bedroom.

2. Dual subsurface sand filters, constructed in series, may be sized at the rate of 120 square feet of surface per bedroom in the first filter and 60 square feet of surface area per bedroom in the second filter in series.

(3) Nonhousehold. Effluent application rates for commercial systems treating domestic waste shall not exceed the following:

1. 1.5 gallon/square feet/day for double bed sand filters.

2. 1.0 gallon/square feet/day for single bed sand filters.

3. Total surface area for any subsurface sand filter system shall not be less than 200 square feet.

69.9(4) Free access sand filters.

a. Description. Media characteristics and underdrain systems for free access filters are similar to those for subsurface filters. Dosing of the filter should provide for flooding the bed to a depth of approximately 2 inches. Dosing frequency is usually greater than two times per day. For coarser media (greater than 0.5 mm) a dosing frequency greater than four times per day is desirable. Higher acceptable loadings on these filters as compared to subsurface filters relate primarily to the accessibility of the filter surface for maintenance. Gravel is not used on top of the sand media, and the distribution pipes are exposed above the surface.

b. Distribution. Distribution to the filter may be by means of troughs laid on the surface, pipelines discharging to splash plates located at the center or corners of the filter, or spray distributors. Care must be taken to ensure that lines discharging directly to the filter surface do not erode the sand surface. The use of curbs around the splash plates or large stones placed around the periphery of the plates will reduce the scour. A layer of washed pea gravel placed over the filter media may also be employed to avoid surface erosion. This practice will create maintenance difficulties, however, when it is time to rake or remove a portion of the media surface.

c. Covers. Free access filters may be covered to protect against severe weather conditions and to avoid encroachment of weeds or animals. The cover also serves to reduce odor conditions. Covers may be constructed of treated wooden planks, galvanized metal, or other suitable material. Screens or hardware cloth mounted on wooden frames may also serve to protect filter surfaces. Where weather conditions dictate, covers should be insulated. A space of 12 to 24 inches should be allowed between the insulated cover and sand surface. Free access filters may not be buried by soil or sod.

d. Loading. The hydraulic loading for free access sand filters should be from 2.0 to 5.0 gpd/sq.ft.

e. Number of filters. Dual filters each sized for the design flow are recommended for loading rates in excess of 3½ gpd/sq.ft. treating septic tank effluent.

69.9(5) Dosing. Dosing for sand filters is strongly advised. Without dosing, the entire area of the sand filter is never effectively used. Dosing not only improves treatment effectiveness but also decreases the chance of premature failure.

a. Pumps. A pump shall be installed when adequate elevation is not available for the system to operate by gravity.

(1) The pump shall be of corrosion-resistant material.

(2) The pump shall be installed in a watertight pit.

(3) The dosing system shall be designed to flood the entire filter during the dosing cycle. A dosing frequency of greater than two times per day is recommended.

(4) A high water alarm shall be installed.

b. Dosing siphons. When a dosing siphon is used where elevations permit, such siphon shall be installed as follows:

(1) Dosing siphons shall be installed between the septic tank and the first filter bed.

(2) Dosing siphons shall be installed with strict adherence to the manufacturer's instructions.

c. Dosing tanks. The dosing tank shall be of such size that the siphon will flood the entire filter during the dosing cycle. A dosing frequency of greater than two times per day is recommended.